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REVISION OF THE MICRO-CADDISFLY GENUS *OXYETHIRA* (TRICHOPTERA: HYDROPTILIDAE) PART III: SUBGENUS *HOLARCTOTRICHIA*

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Abstract.—The subgenus *Holarctotrichia* Kelley of the micro-caddisfly genus *Oxyethira* is revised. Two species groups are included. Species descriptions and illustrations as well as phylogenetic and biogeographical discussions of the eight known species are provided.

The micro-caddisfly genus *Oxyethira* Eaton is among the largest genera (in terms of numbers of species) in the family Hydroptilidae and is found in every biogeographical region. This study is the third part of a review of the genus (Kelley, 1984, 1985), and deals with the subgenus *Holarctotrichia* Kelley. Subgenus *Holarctotrichia* includes eight known species from the Holarctic Region. Within the subgenus are two distinct species groups, the nearctic forcipata group and the holarctic distinctella group. The archaica group, listed in Kelley (1984), is dissolved here, with *iglesiasi* Gonzales and Terra transferred to subgenus *Oxyethira* (falcata group) and *elerobi* (Blickle) placed in incertae sedis. Two other species, *dunbartonensis* Kelley and *setosa* Denning, were earlier included in this subgenus (Kelley, 1984). Although they do bear similarities to species of this subgenus, the former is better considered a primitive offshoot from the lineage leading to this subgenus while the latter belongs to the subgenus *Oxyethira*. Males of subgenus *Holarctotrichia* are distinct from those of other subgenera in having a combination of long dorsolateral processes of segment VIII, convergent but not distally fused subgenital processes and an aedeagus with an elongate titillator. Females are characterized by the presence of a dorsal knob on tergum VIII, a small sternum VIII and divergent apodemes.

Type specimens are deposited in the following locations: Urbana, Illinois, USA—The Illinois Natural History Survey (*araya* and *serrata*); Lunz am See—Malicky personal collection (*archaica*); Helsinki, Finland—The Zoological Museum (*distinctella*); London, England—The British Museum (Natural History) (*forcipata* and *michiganensis*); St. Paul, Minnesota USA—The University of Minnesota Insect Collection (*obtatus*); Zurich, Switzerland (*sagittifera*).

Subgenus *Holarctotrichia* Kelley

Figs. 1–4

Type Species.—*Oxyethira distinctella* Mac Lachlan, 1880.

Length: 2.4–3.5 mm. *Spur Formula:* 0-3-4. *Wing:* R4 and R5 not fused.


sg
bp
sl
VIII
forcipata
IX
VII
dp
ia
archaica
obtatus
serrata
araya
pl
distinctella
michiganensis
sagittifera

Male.—Antenna 28–40 segmented; with or without placoid sensilla. Venter VII with apico-mesal process. Segment VIII: venter deeply excised or not; dorsum deeply excised; pleuron with dorsolateral process subtended by excision, anteriorly protruded within segment VII. Segment IX: venter broadly rounded anteriorly, reaching to caudal end of segment VII; dorsum with anterior margin distinct and protruded anteriorly from pleuron but with posterior margin indistinct with reduced sclerotization; posterolateral process usually present on pleuron. Inferior appendages reduced to darkened, truncate margins of broad mesocaudal lobe on venter IX or lacking completely; setal lobes often elongate. Subgenital processes distally convergent but not fused; bilobed process with elongate lobes. Aedeagus usually lacking distal processes or membranous areas; titillator encircling aedeagus one-half time, reaching to two-thirds the distance to apex.

Female.—Antenna 23–25 segmented. Venter VI with apicomesal process. Tergum VIII short with dorsal setose knob overlapping tergum IX; apodemes elongate, divergent; sternum VIII short, broad, well sclerotized, protruded ventrally on each side. Tergum X short. Spermathecal sclerite in posterior region of segment VII; horizontal lamella squared anteriorly.

Forcipata Group

Male.—Antenna: 34–37 segments. Segment VIII: venter shallowly excised; dorsolateral process usually reduced. Segment IX: venter caudally setose. Inferior appendages: indistinct. Setal lobes elongate with several setae. Subgenital processes: distally convergent and blunt. Bilobed process with lobes narrowed apically.

Female.—Antenna: 23–26 segments. Segment VIII: tergum with mid-dorsal knob bearing peg-like setae; sternum flattened in lateral view.

Oxyethira forcipata Mosely, 1934

Male.—Antenna: 34–38 segments. Segment VIII: dorsolateral process short and blunt; pleuron not protruded into segment VII. Segment IX: anterodorsal margin concave; venter with caudomesal protuberance. Aedeagus: narrow-elongate with base in segment VI.

Female.—Antenna: 23–24 segments.

Distribution.—Southern Appalachians to Ontario and Wisconsin.

Oxyethira michiganensis Mosely, 1934

Male.—Antenna: 35 segments. Segment VIII: dorsolateral process broad basally with proximal spine and narrow-curved distally with elongate apical seta; pleuron deeply protruded into segment VII. Segment IX: anterodorsal margin rounded; venter broadly convex along caudal margin.

Female.—Antenna: 23–24 segments. Segment VIII: mid-dorsal knob nearly disconnected from remainder of tergum VIII.

Distribution.—Eastern Nearctic.

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Fig. 1. Terminal abdominal segments of adult males of the subgenus *Holarctotrichia*; lateral view. bp—bilobed process, dp—dorsolateral process, ia—inferior appendages, pl—posterolateral processes, sg—subgenital process, sl—setal lobe.

Oxyethira obtatus Denning, 1947

Male.—Antenna: 35 segments. Segment VIII: dorsolateral process long and narrow; pleuron shallowly protruded within segment VIII. Segment IX: anterodorsal margin concave; mesocaudal margin concave and serrate. Aedeagus: apex tipped with a pair of minute spines.

Female.—Antenna: 24 segments.

Distribution.—Northeastern North America.

Oxyethira serrata Ross, 1938

Male.—Antenna: 35–37 segments. Segment VIII: dorsolateral process stout and serrate along dorsal margin; pleuron deeply protruded within segment VII. Segment IX: anterodorsal margin rounded; venter caudally indistinct.

Female.—Antenna: 26 segments. Tergum X: broadened distally.

Distribution.—Eastern Nearctic.

Distinctella Group

Male.—Antenna: 28–39 segments. Segment VIII: venter excised at least one-half its length; dorsolateral process elongate with 3–4 distal teeth and subtended by deep excision. Segment IX: elongate posterolateral process. Inferior appendages: fused onto shallowly bifurcate median plate; setal lobes blunt. Subgenital processes: apically tapered.

Female.—Antenna: unknown. Segment VIII: sternum broad in lateral view.

Oxyethira araya Ross, 1938

Male.—Antenna: 38 segments. Segment VIII: pleuron deeply protruded within segment VII. Segment IX: posterolateral process straight. Aedeagus: apex with spine.

Female.—Sternum VII not excised. Segment VIII: apodemes divergent.

Distribution.—Northeastern United States and maritime Canada.

Oxyethira distinctella Mac Lachlan, 1880

Male.—Antenna: 28 segments. Segment VIII: pleuron deeply protruded within segment VII. Aedeagus: apex simple, without spine.

Female.—Sternum VII deeply excised. Segment VIII: apodemes divergent.

Distribution.—North and central Europe.

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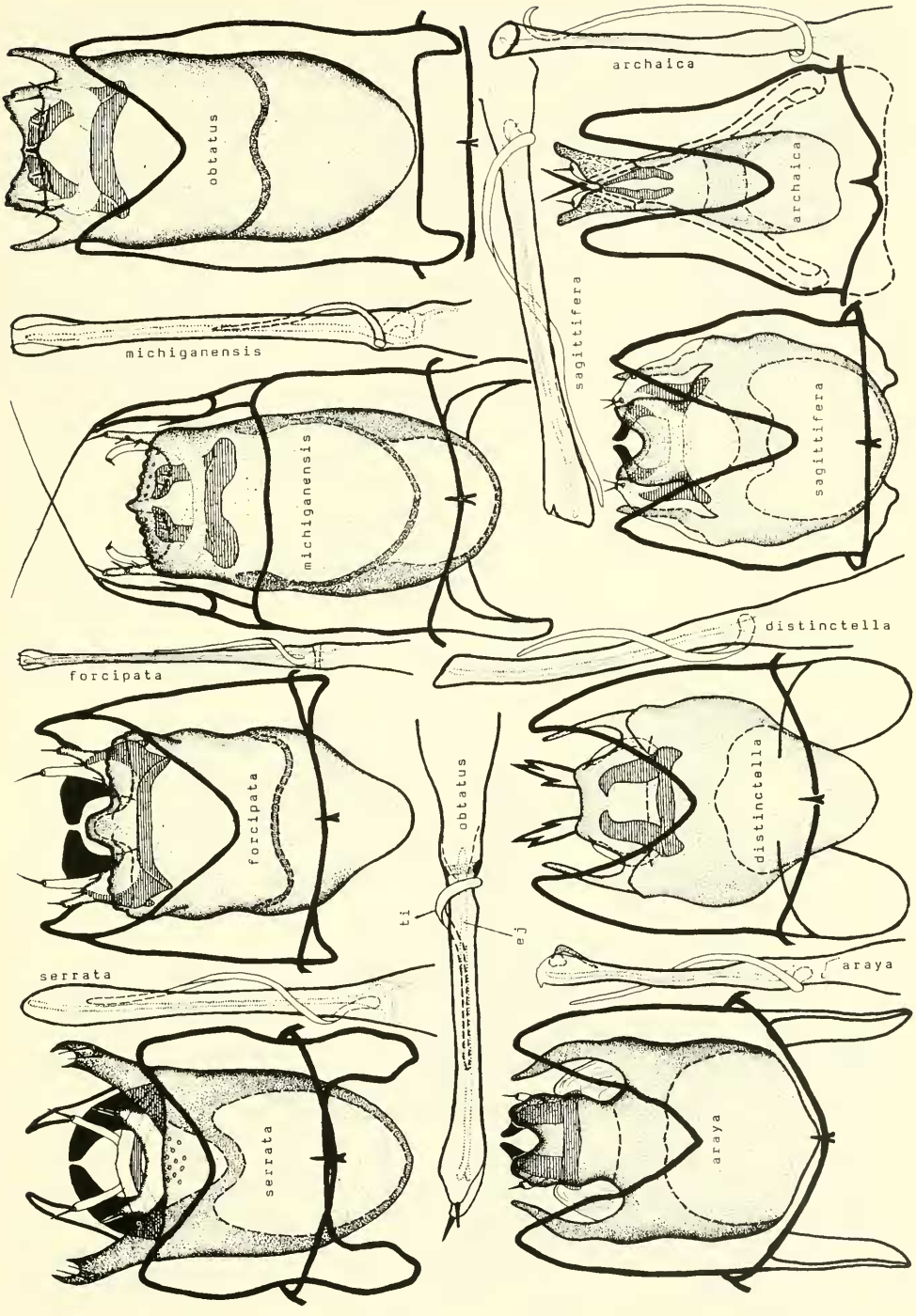
Fig. 2. Terminal abdominal segments of adult males of the subgenus *Holarctotrichia*; ventral view and aedeagus. ej—ejaculatory duct, ti—titillator.

Fig. 3. Terminal abdominal segments of adult females of the subgenus *Holarctotrichia* (lateral view) and maps of species distributions. ap—apodeme of segment VIII, ss—spermathecal sclerite.

Fig. 4. Terminal abdominal segments of adult females of the subgenus *Holarctotrichia* Kelley (dorsal view of segments VIII–X and ventral view including internal sclerites) and phylogeny of subgenus. hl—horizontal lamella, sp—spermathecal process.


obtatus
archaica
archaica
sagittifera
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michiganensis
michiganensis
distinctella
forcipata
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araya
serrata
serrata
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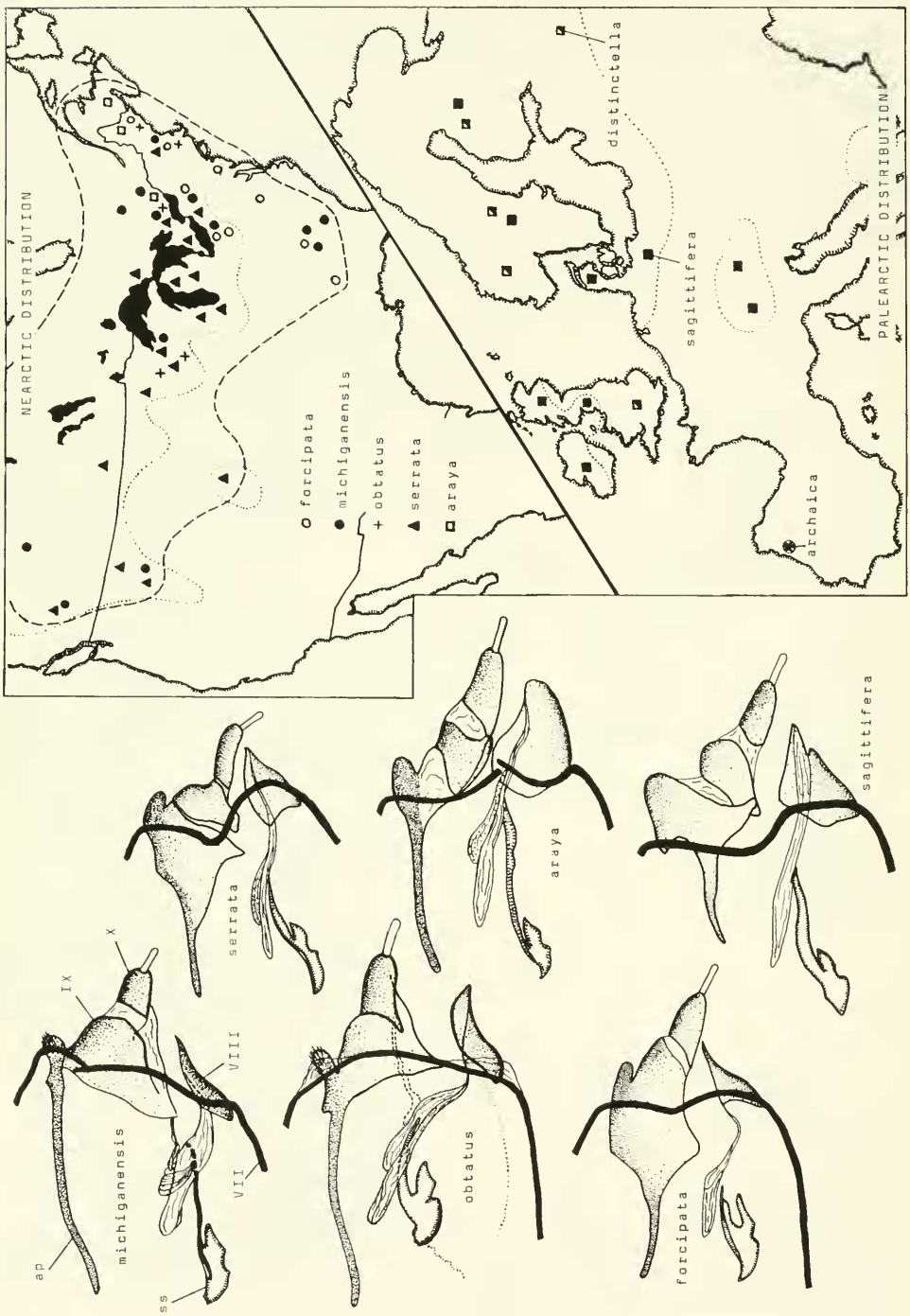
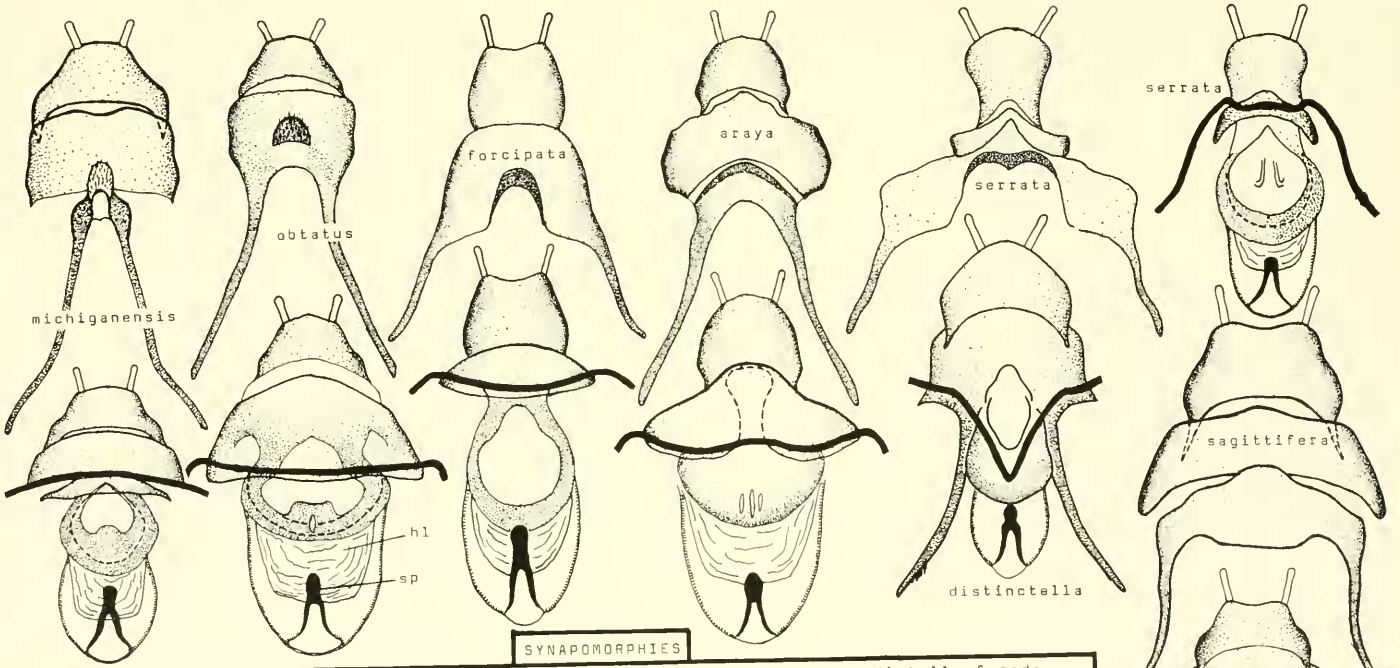
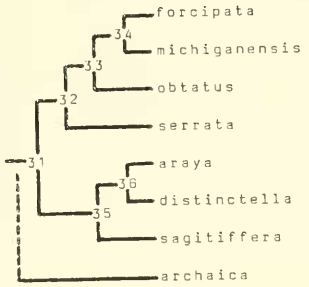

NEARCTIC DISTRIBUTION
PALEARCTIC DISTRIBUTION
forcipata
michiganensis
obtatus
serrata
araya
distinctella
sagittifera
archaica
ap
ss
VII
VIII
IX
X
XI





SYNAPOMORPHIES

31 Male: Subgenital processes convergent but not distally fused; pleuron VII protruded anteriorly with elongate dorsolateral process.
Female: Apodemes of segment VIII divergent.

32 Male: Venter IX caudally truncate and setose; anterior edge of pleuron IX caudad of anterior edge of dorsum and venter IX

33 Male: Titillator reduced in length with apex ventral to aedeagus
Female: Tergum VIII reduced to apodemes joined by mesal knob and nearly disconnected from tergum IX.

34 Male: Posterolateral process IX lacking; venter IX with mesal protuberance on caudal margin; both setal lobes and bilobed process elongate.

35 Male: Posterolateral process IX elongate; dorsolateral process VIII with 2-4 distal teeth.

36 Male: Posterolateral process IX straight-attenuate.

Oxyethira sagittifera Ris, 1897

Male.—Antenna: 38–39 segments. Segment VIII: pleuron not protruded within segment VII. Segment IX: posterolateral process sinuate. Aedeagus: apex simple, without spine.

Female.—Sternum VII not excised. Segment VIII: apodemes nearly parallel.

Distribution.—North and central Europe.

Unplaced to Species Group

Oxyethira archaica Malicky, 1975

Male.—Length 2.5–3.0 mm. Antenna: 40 segments. Dorsolateral processes elongate, proceeding ventrally and turning horizontally, tipped with one long spine; ventrolateral lobe narrow-elongate. Venter IX truncate anteriorly; dorsum a broad band. Inferior appendages with distolateral truncate processes. Subgenital processes hook-like in lateral view. Aedeagus widened distally; distal processes lacking; titillator recurved apically.

Female.—Those tentatively associated with this species seem more likely to be those of *Oxyethira iglesiasi* Gonzales & Terra, also from Portugal.

Distribution.—Portugal.

Biogeography

Fig. 3

The subgenus *Holarctotrichia* is restricted to the Holarctic Region. Larvae show a distinct preference for lentic habitats, particularly lakes and ponds, although the larvae of *michiganensis* Mosely and *forcipata* Mosely may inhabit areas of slow current in rivers.

The forcipata group is nearctic and inhabits an area extending from northeastern United States south to the southern Appalachian Mountains and west to British Columbia. The northern limit of this endemic area is unknown but is probably related to temperature tolerance. A close correlation can be seen between the range of the forcipata group and the distribution of natural lakes in North America. This is particularly true of *serrata* and *obtatus*. The other two species, *forcipata* and *michiganensis*, exhibit a range extension into the southern Appalachians and their eastern foothills. It seems that this is due to adaptation by larvae of these two species to depositional areas of cold water rivers of the Appalachian mountains. They have not been collected from the many man-made reservoirs of southeastern United States.

Distributional patterns of the distinctella group are similar to those seen in the forcipata group. Two species are known from the palearctic region, *distinctella* and *sagittifera*. Both occur in northern Europe and the Alps, where natural lakes are abundant. A third species of the group, *araya*, occupies a small range from Ontario to New Brunswick. The larvae of *archaica* are known only from rivers in northern Portugal.

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